



## SYSTEMS AND METHODS FOR CONTINUOUS MOTION REGISTRATION DISTRIBUTION WITH ANTI-BACKLASH AND EDGE SMOOTHING

### BACKGROUND

[0001] The invention relates generally to a reprographic fusing device for fixing a toner image to a substrate. More specifically, the invention relates to a fusing device that is continuously movable relative to the print medium during printing

[0002] In electrostatic printing, a dry marking material, such as toner, is fused to a substrate, such as a paper sheet. Fusing occurs when the substrate is subjected to pressure and/or heat to permanently affix the marking material to the substrate. Most common electrostatic printers use a fuser roll and a pressure roll that form a nip for the substrate to pass through. In many such printers, a variety of different size sheets may be passed through the nip of the rollers.

[0003] All conformable rolls suffer from surface wear, especially where the edges of the sheets contact the roll surface. Fig. 1 shows how the edges and body of 11" and 14" sheets of paper are distributed along the surface of a fuser roll in the axial direction in printers without a registration distribution system. In such printers, the sheet edges produce a stress concentration as they pass through the fuser nip under pressure, causing the thin surface coating on the roll, as well as the elastomeric layer under the surface, to degrade. The degradation of the roll is often manifested as a narrow area of lower gloss from a lead edge to a trail edge across the print fused to the substrate. In the context of mixed paper sizes, a 14" print often shows a differential gloss streak 11" in from the outboard (registered) edge. Such artifacts become visible to the customer after only a few thousand prints have passed through the fuser, far short of the target life of the roll.

[0004] One proposed solution to such problems is to change fuser rolls to accommodate different size papers. However, this method is not always practical or in keeping with existing program goals. For example, if only one paper size is run for a given roll set, the edge wear exists, but is outside the normal visible area of the print and goes un-noticed.

[0005] Another proposed solution is provided in U.S. Patent 5,323,216 which discloses a lateral moving fuser station. The lateral moving fusing station is an intelligent system in which detection of incoming paper size is utilized to reposition

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